

STANDARDS DEVELOPMENT BRANCH OMCE



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Cottage pollution control
program 1970 : Balsam Lake.
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ONTARIO WATER RESOURCES COMMISSION
1970 COTTAGE POLLUTION CONTROL PROGRAM
BALSAM LAKE

As a result of recommendations contained in the March, 1970 report on Environmental Management of Recreational Waters in Cottage Areas in Ontario, staff of the Ontario Water Resources Commission's District Engineers Branch conducted two field surveys of Balsam Lake in the Kawartha Lakes region. The first water quality survey occurred during June 8 to 12, 1970, prior to the height of the summer recreational season, while the August 17 to 21, 1970 survey was conducted while summer recreational activity was at a maximum.

During the first survey, the bacteriological quality of the water was good, with the total and fecal coliform geometric mean densities (see appended map) meeting the OWRC criteria for the total body contact recreational use. In contrast, the total coliform levels during the mid-summer survey did not meet the OWRC criteria at most sampling locations (see appended map). Seven out of thirty-five locations had fecal coliform levels which did not meet the OWRC criteria and in almost all cases, the twenty-eight remaining stations had some individual fecal coliform counts in excess of 100 organisms per 100 ml. The fecal streptococcus geometric mean densities met the OWRC criteria during both survey periods.

Thermal stratification, a natural occurrence in many lakes, was not observed during either survey. Its absence was probably due to factors such as lake morphometry, depth, and wind action, which resulted in the mixing of the top and bottom lake waters.

The dissolved oxygen content in the surface waters was above the minimum level designated by the OWRC for the preservation of warm water organisms. However, west of Grand Island, the dissolved oxygen content at 10 to 20 feet below the surface (depending on location) decreased below an acceptable level. This oxygen depletion is attributed to the decomposition of large quantities of organic matter on the lake bottom.

The mineral content of the waters was relatively low. The hardness in mid-summer was approximately 30 ppm in the Gull River flow and generally between 50 and 55 ppm in the lake.

The 1971 bacteriological survey, presently underway, should provide information to indicate with more certainty, the sources of the bacterial impairment.

Staff of the Ontario Department of Health's Public Health Engineering Service expect to investigate the on-shore private sewage disposal systems of this lake as part of the on-going program in the Kawartha Lakes system.

BACTERIOLOGICAL INDICATOR ORGANISMS

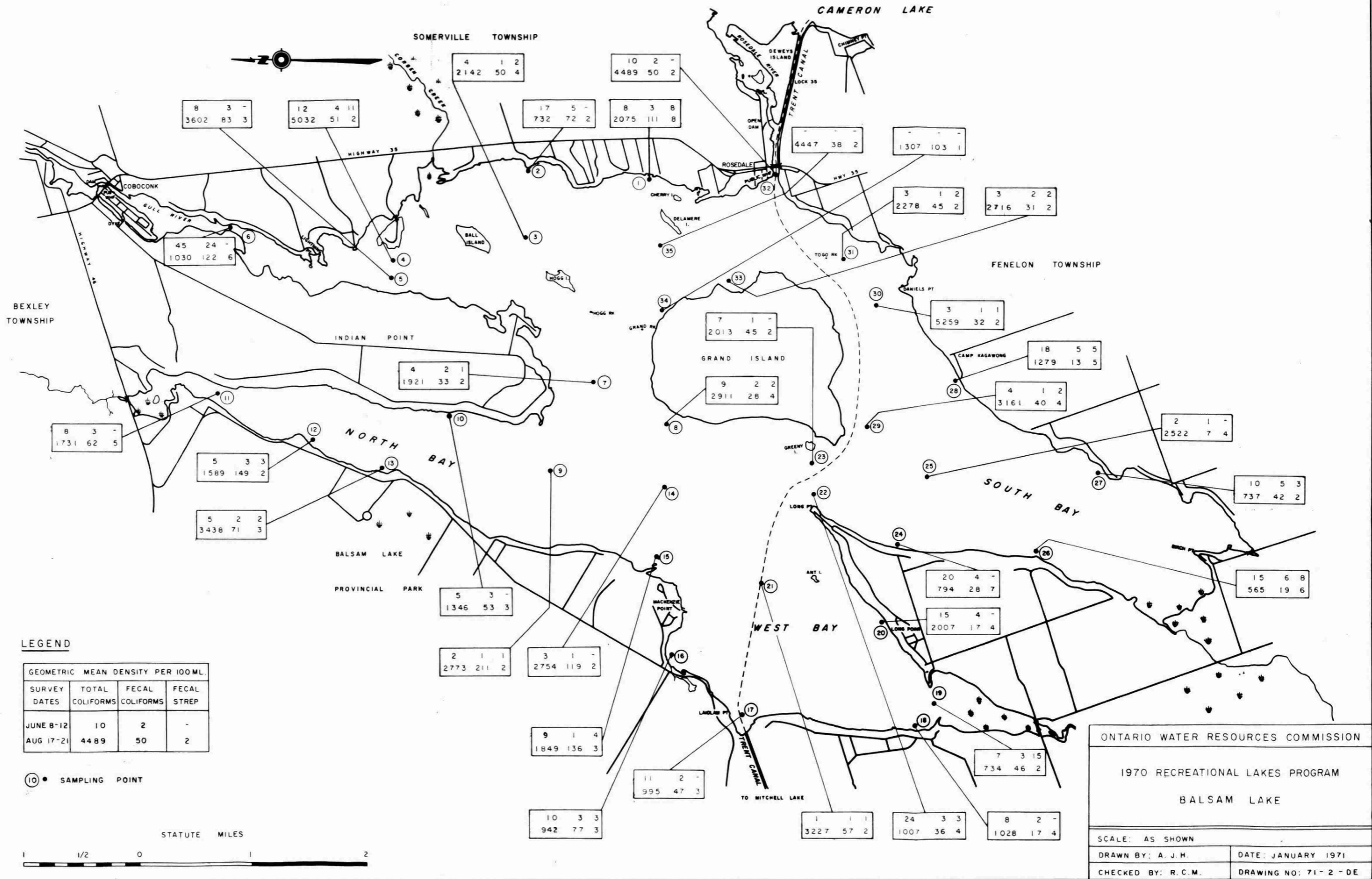
TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherischia Coli (E. coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil run-off or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherischia Coli group, and even to multiply when suitable environmental conditions exist.

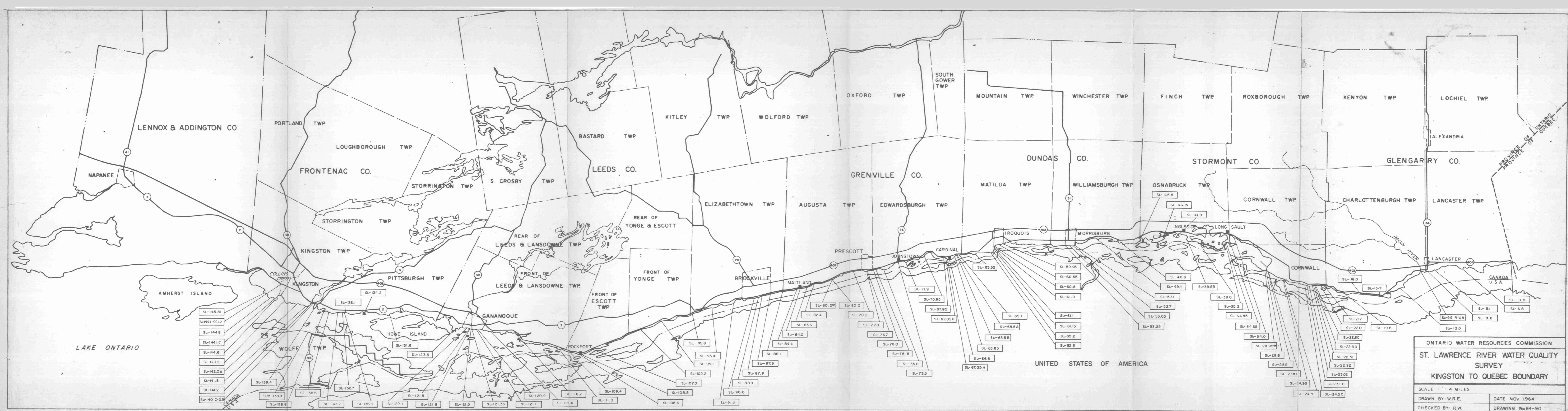
The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000,100, and/or 20 per 100 ml, respectively.

NOTE: The term "geometric mean" refers to a type of average. Mathematically speaking, the geometric mean of a set of N numbers is the Nth root of the product of the numbers; in practice, it is computed by the use of logarithms.





ONTARIO WATER RESOURCES COMMISSION
ST. LAWRENCE RIVER WATER QUALITY
SURVEY
KINGSTON TO QUEBEC BOUNDARY

SCALE 1" = 4 MILES
DRAWN BY W.R.E. DATE NOV 1964
CHECKED BY R.W. DRAWING No 64-90